FINAL

Environmental Impact Statement/Environmental Impact Report
Cullinan Ranch Restoration Project
Solano and Napa Counties, California

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CULLINAN RANCH RESTORATION PROJECT
Final Environmental Impact Statement/Environmental Impact Report
Solano and Napa Counties, California

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Abstract: The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) fully discloses the environmental impacts of implementing the proposed restoration of the Cullinan Ranch. The U.S. Fish and Wildlife Service (Service) and the California Department of Fish and Game are proposing a restoration plan for 1,500 acres of former hayfield farm land in the San Pablo Bay. This restoration project would combine tidal salt marsh habitat for endangered species, waterfowl, waterbirds, and fish, as well as public access features to increase accessibility to wildlife resource values in the San Pablo Bay, while minimizing project-induced flood impacts to Highway 37. The Cullinan Ranch is managed by the Service as part of the San Pablo Bay National Wildlife Refuge.

The Final EIS/EIR was prepared in compliance with the National Environmental Policy Act and the California Environmental Quality Act. Because the comments received on the draft EIS/EIR did not warrant substantive changes to the draft document, the final EIS/EIR includes an errata sheet indicating where the draft document is revised, comments received on the draft document, and the formal responses to comments.

Table of Contents

I. INTRODUCTION TO FINAL ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

This Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Cullinan Ranch Restoration Project was prepared by the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) to evaluate the potential environmental impacts of the proposed restoration of the Cullinan Ranch Unit of the San Pablo Bay National Wildlife Refuge (Refuge).

The goal of the proposed restoration project is to restore tidal influence to Cullinan Ranch to allow restoration of its near-historic state as mature tidal marsh. The objective of the proposed action is to contribute to the increased provision of suitable habitat to support endangered species such as the salt marsh harvest mouse and the California clapper rail in the larger San Francisco Bay ecosystem.

The Final EIS/EIR was prepared in accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (40 CFR Parts 1500-1508), and the California Environmental Quality Act (Public Resources Code Section 21000 et seq.). These regulations provide that when changes to the final document in response to comments are minor, agencies may write them on errata sheets and attach them to the statement instead of rewriting the draft statement. In such cases only the comments, the responses, and the changes and not the final statement need be circulated (40 CFR 1503.4). The USFWS and CDFG have taken this approach in preparing the Final EIS/EIR.

Issues raised during the public review period include the following:

- public access through the Bay Trail system,
- effects of sea level rise on the proposed restoration,
- potential effects to endangered species such as the salt marsh harvest mouse, and
- the need to mitigate the use of riprap on the levee through placement of soil on the riprap.

Responses to the issues raised in the comment letters are provided in Section III. Please refer to Appendix 1 for a complete list set of comment letters.

Project Location

The Cullinan Ranch Restoration Project is located near the northern shore of San Pablo Bay in Solano and Napa Counties. The Cullinan Ranch Restoration Project is within the existing Refuge boundary and is bordered by the South Slough and Dutchman Slough to the north and Highway 37 to the south. California Department of Fish and Game Pond 1 (part of the Napa Sonoma Restoration Project (NSRP)) borders Cullinan Ranch to the west. Guadalcanal Village, which is owned by the State of California and has been

restored to tidal marsh, borders Cullinan Ranch to the east.

National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) Process

The intent of the EIS/EIR is to disclose to the public the environmental impacts associated with the proposed restoration project. The EIS/EIR will be used by the lead agencies when considering approval of the restoration project.

Scoping

Scoping refers to the process under both NEPA and CEQA that is used to determine the focus and content of an environmental document. Public scoping for this project was first announced in a notice of intent to prepare an environmental assessment on July 15, 2002. Notices were sent to various newspapers in the San Francisco Bay area. The first scoping meeting was held on August 2, 2002, and a second scoping meeting was held on March 9, 2007. During preparation of the environmental assessment, we determined that the scope of the restoration would require an EIS/EIR based on feedback from regulatory personnel. On September 6, 2007, we announced a notice of intent to prepare an EIS/EIR and sent notices to various newspapers and interested parties and agencies in the San Francisco Bay area.

Draft EIS/EIR

A Notice Of Availability (NOA) for the Draft EIS/EIR was published in the Federal Register on May 2, 2008 to notify agencies and the public that the Draft EIS/EIR was available for review and comment. Pursuant to CEQA Guidelines, the Draft EIS/EIR along with a Notice of Completion was filed with the Office of Planning and Research (OPR) for state agency review. Copies of the Draft EIS/EIR were available for public review at the following locations:

- Refuge Headquarters Office, San Pablo Bay National Wildlife Refuge, 2100 Highway 37, Petaluma, CA 94954
- San Francisco Bay National Wildlife Refuge Complex, 9500 Thornton Avenue, Newark, CA 94560
- John F. Kennedy Public Library, 505 Santa Clara, Vallejo, CA 94590
- http://www.fws.gov/cno/refuges/cullinan/index.cfm

The Draft EIS/EIR was circulated for a 45-day pubic and agency review period beginning on May 2, 2008. To accommodate several requests from the public, the review period was extended to August 7, 2008. A public meeting to solicit comments on the draft document was held on May 30, 2008.

The USFWS and CDFG considered all comments on the Draft EIS/EIR provided by the public, federal, and state agencies. Formal responses to comments are contained in Section II, below.

Final EIS/EIR

As described in the Introduction above, the Final EIS/EIR consists of the comments, responses, and errata section. The Draft EIS/EIR is available upon request. A NOA for the Final EIS/EIR will be published in the Federal Register and in local newspapers, and the Final EIS/EIR will be filed with the U.S. Environmental Protection Agency as required by NEPA. The USFWS and CDFG will provide notices of the Final EIS/EIR to all who commented on the Draft EIS/EIR.

The USFWS will wait 30-days before making a decision on the project. Any comments received during this 30-day wait period will be considered in the decision making process. Under CEQA Guidelines, the CDFG will send responses to comments to other state agencies prior to certification of the EIR.

Record of Decision

The final step in the NEPA process is the preparation of the Record of Decision (ROD), which presents a concise summary of the decision made by the USFWS. At the conclusion of the 30-day waiting period following publication of the Final EIS/EIR, the USFWS will prepare and sign the ROD regarding the proposed restoration. The ROD will summarize the proposed action and alternatives considered in the EIS/EIR; identify and discuss factors considered in the federal lead agency's decisions; and state how these considerations entered into the final decision. If appropriate, the ROD will state how the proposed restoration project will be implemented and describe any associated mitigation measures.

EIR Certification

The final step in the CEQA process is certification of the EIR, which includes preparation of a Mitigation Monitoring and Reporting Plan, adoption findings by the lead agency (CDFG). The Findings may include Statement of Overriding Considerations (if required) should the Cullinan Ranch Restoration Project be approved. A certified EIR indicates the following:

- the document complies with CEQA;
- the decision-making body of the lead agency reviewed and considered the Final EIR prior to approving the project; and
- the Final EIR reflects the lead agency's independent judgment and analysis.

After approval of the Project, the CEQA lead agency, CDFG, is required to file a Notice of Determination with OPR and the relevant county clerks within five working days.

Mitigation Monitoring and Reporting Program (CEQA)

CEQA Section 21081.6(a) requires lead agencies to "adopt a reporting and mitigation monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." The Mitigation Monitoring and Reporting Program (MMRP) required by CEQA need not be included in an EIR.

Refuge staff are currently formulating the MMRP for Cullinan Ranch Restoration Project. The MMRP will integrate successful techniques and lessons learned from the adjacent NSRP, which was completed in 2006, and from the restoration of the Napa Plant Site North, breached in October 2008. The plan will be implemented by the Refuge as a component of their normal operations.

II. RESPONSES TO COMMENTS

Written comments on the Draft EIS/EIR dated April 2008 were received, containing a total of 42 comments. The response to these comments follows; they are grouped by comment letter, and comment letters are presented in alphabetical order by author/agency. Each comment is followed by "Concur-text changed", "Comment acknowledged with additional clarification" and "Comment acknowledged". Concur-text changed means that text presented in the Draft EIS/EIR has been changed in response to the comment. The revised text is presented in the errata section (Section II). Comment acknowledged with additional clarification means that the text has not been changed but further explanation has been provided in the comment response to clarify the existing text for the reviewer. Comment acknowledged means that the comment was reviewed and no additional clarification was needed. If several comments by the same author addressed similar issues the comments were grouped together and a single response is provided.

1. Comment Letter 1. Peter R. Baye, Ph.D., Coastal Plant Ecologist

Rock armor shore stabilization, high marsh habitat gradients, and endangered species populations—Comments one through three focus on concerns regarding the negative impacts of using rock armor adjacent to wetlands including weed invasions and non-native rodents that often populate rip-rap, the paucity of details as to how the project will assure the persistence of local founder populations of Salt Marsh Harvest Mouse (SMHM) and the long length of time required for Cullinan Ranch to reach vegetated marsh plain if we do not use fill.

1-A. Response to Comment 1: Naked riprap and erosive effects of winds
Concur-Text Changed

For changed text related to this comment, see Table ES-1; Errata to the Draft EIS/EIR (Errata) Chapter 2 numbers 1, 2, 4, 6, 10, and 11; and Chapter 3 number 8.

Highway 37 presents a barrier to ground movement of wildlife and may act as a population sink for some wildlife populations that occur adjacent to the highway. The Refuge has documented mortality of a wide variety of wildlife species along the Highway 37 corridor. Wildlife mortalities on Highway 37 were recorded for a period of one year from 1999 through 2000 (Winton and Takekawa 2001). Within the single year, a total of 291 birds and mammals along with several reptiles were observed dead on the pavement or immediately adjacent to the highway shoulder (Winton and Takekawa 2001). As such, it is the intent of this project to minimize the amount of viable wildlife habitat immediately adjacent to Highway 37. Other viable alternatives that were considered for armoring included pavement blocks and benching techniques similar to those used at the Tubbs Setback unit of the Refuge. However, since our intent is to minimize development of habitat immediately adjacent to Highway 37, benching and/or gentle sloping was

eliminated as an alternative. Pavement blocks would not increase the level of protection for the highway but would increase the cost substantially.

Riprap will be used to protect a section of Highway 37 that measures a little less than two and one half miles in length. Riprap will be placed with a fabric backing in accordance with Caltrans specifications. The riprap will be thirty inches thick and conform to the existing highway embankment slope. The ditch that currently exists at the base of that slope will be filled along its entire length with fill from an onsite location. A five foot wide riprap footing will be installed on the filled ditch, flush with the field elevation to support the riprap placed on the highway embankment. The upper edge of the riprap will be placed at 7.0 feet NGVD. Modifications will include planting bare levee soil above the 7.0 feet NGVD with native salt tolerant grasses. In addition, the top portion of riprap between Mean Higher High Water (MHHW), approximately 3.7 feet, and 7.0 feet NGVD will be covered with soil and then planted with native salt tolerant grasses. The intent of the grass cover is to minimize infestation by non-native or invasive plant species. Assuming 1 foot of fill placement depth, filling the riprap from approximately 3.7 feet NGVD to the upper extent of the riprap at 7.0 feet NGVD would result in the additional excavation of approximately 5,000 cubic yards (cy) of onsite material, an increase of 1.38% in the cy of excavation for the entire site. This action would result in the additional excavation and fill of 3.1 acres, a change in the area of disturbance of 1.6%. These actions and the presence of the existing highway and its inherent impacts will negate the impacts of placing riprap along Highway 37. The area covered by the approximately two and one quarter-mile stretch of riprap equals 133,485 square feet, 3.1 acres, or 0.20% of the total 1,525-acre project area.

Observations noted throughout the North Bay on several restoration projects including Pond 3, Lower Tubbs Island, and Lower Tubbs setback, indicate erosion patterns are a result of prevailing winds from the southwest. Erosive forces are expected to be the heaviest along the north levee of the Cullinan Ranch Restoration Project. However, it is prudent and a requirement of this project to protect Highway 37 from winds arising in northeast directions and high tide/storm events. All construction along Highway 37 will meet Caltrans standards for protection. If available from outside sources and funding allows, soil materials will be used to construct subtidal berms parallel to the highway to break the wave energy associated with northeast winds. Highway 37 is a hazardous corridor and it is imperative that its protection require minimal maintenance for the safety of Refuge staff and the public.

1-B. Response to Comment 2: Salt Marsh Harvest Mouse
Comment acknowledged with additional clarification;

For clarifications related to this comment, see Table ES-2 BIO-3, BIO-10, and BIO-20; Errata Chapter 2 numbers 1 and 9; Chapter 3 numbers 11, 17, 25, 32, and 33.

Guadalcanal Village is a tidal marsh immediately adjacent to the eastern border of the proposed project that supports a breeding population of salt marsh harvest mice (Woo, et al. 2007). The Guadalcanal Village site along with populations that are also likely occur

at Pritchett Marsh, will provide a source population for the Project area. The proposed 0.7 mile buttress levee adjacent to Guadalcanal Village will protect Highway 37 from Project induced flooding and will provide some suitable habitat for SMHM on its 10:1 slopes. The buttress levee will be constructed parallel to Highway 37 separated by a swale to capture runoff waters from the highway. The swale will gradually diminish as the levee approaches the 0.7 mile mark where it will merge into the shoulder of the Highway. Consequently, it is likely that the benefits of habitat to SMHM will outweigh the potential adverse effects from proximity to the highway in that location. However, since there is intent to create most of the habitat away from Highway 37, habitat development will be focused on the north side of the Cullinan Ranch Site (Site). The north levee of the Site extends from Guadalcanal Village to the CDFG Pond 1 levee for a length of approximately 5 miles. As stated in the Draft EIS/EIR, the majority of the levee will be lowered to a range between MHHW and Mean High Water (MHW) in coordination with levee breaching. The northern levee adjacent to the PG&E towers will not be lowered. The top layers of soil will be pushed inward into the Site with a flat slope transitioning down to field elevation. This will create additional acres of SMHM habitat. Additional materials will be added to the inside of this levee to broaden areas closest to Guadalcanal Village continuing westward prior to breaching, to the extent that clean fill is available and budget allows. Using Guadalcanal Village as a base, this extended habitat development on the north levee will provide additional pickleweed tidal marsh habitat beneficial to native estuarine species, including SMHM. It is estimated that the project would provide a minimum of 30 acres of high quality SMHM habitat within the first few years after breaching the Site. This is compared to the already existing l5 acres of low quality habitat that will be flooded. Seeding and planting of native tidal marsh upland ecotone species will occur along the buttress levee and other areas of extended gentle slopes. This action will reduce invasive species issues and create high tide refugia for SMHM.

The information above does not represent a design change from the project description presented in the Draft EIS/EIR, rather it quantifies that the preferred alternative presented in the draft will create more than 30 acres of SMHM habitat by lowering the existing levees to marsh plain elevation. If additional import material is available and budget allows, the project would seek to import sufficient fill to create an additional 50 acres of marsh plain habitat suitable for SMHM colonization adjacent to Guadalcanal Village. This would require the importation of 404,000 cy of fill by barge or by pumping it from nearby sites and would reflect an 112% increase in the amount of fill being imported.

1-C. Response to Comment 3: Plants
Concur-Text Changed

For changed text related to this comment, see Table ES-2 BIO-14 and BIO-31; Errata Chapter 2 numbers 1, 2, 4, 9, 10, and 11; Chapter 3 numbers 8 and 15.

Surveys to determine presence or absence of special status plant species will be conducted prior to construction activities and special status plant species, if located, will

be salvaged and propagated at the Refuge native plant nursery. These plants will be re-introduced to the Site or other locations on the Refuge at a later time.

Construction equipment brought to the Site will be inspected and washed before entering and upon exiting the work-site to prevent spread of non-native weeds or invasive species. An assessment will be made to prioritize current and potential future invasive plant threats to the project. Early detection and rapid response protocols will be incorporated into the monitoring plan to reduce threats from invasive plants within and adjacent to the Site. The Refuge has an active tidal marsh invasive plant monitoring and control program. The program uses a circular plot method with a stratified random design developed by the National Institute of Invasive Species (2005) in collaboration with the U.S. Geological Survey (USGS). The goal is to sample the plots at least once every five years. This program will be extended to the Cullinan Ranch Restoration Project following project commencement. The priority control species at this time are perennial pepperweed (*Lepidium latifolium*) and non-native *Spartina* species.

The introduction of tidal flow will eliminate salt-intolerant species such as pampas grass (*Cortaderia selloana*) and stinkweed (*Dittrichia graveolens*). In addition, the north levee will be lowered to MHHW. This action will reduce presence of weeds that cannot tolerate flooding or high salinity. Slopes above MHHW will be planted with salt tolerant native grass species to prevent establishment of weeds. All areas above MHHW will be mowed where feasible (e.g., along Highway 37). Other control methods will include the use of herbicides pre-approved by the USFWS Integrated Pest Management program.

1-D. Response to Comment 4: Sea Level Rise and Project Design: What are the Consequences for Assessment of Significant Impacts and Mitigation? How Does the Project Address Sea Level Rise?
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 5; Chapter 3 numbers 2, 3, 6, and 7.

The CALFED Independent Science Board (Mount, 2007) recommended that "given the inability of current physical models …it is prudent to … use the range of 70 to 100 cm [or higher]… in planning flood management". Current predictions of sea level rise and sediment budgets are varied and there are no conclusive data about the actual levels of sea rise and sediment accretions expected within the time period covered by the scope of this project. This uncertainty has created a difficult environment toward which to manage. The Site is already well below existing sea level and would require extensive fill to bring it to marsh plain under current sea level conditions. The amount of fill necessary to raise the site to that level is not likely to be available (personal communication, Tom Gandesbery, State Coastal Conservancy). This project intends to provide interim salt marsh habitat as well as deep water habitat for the next 30 to 50 years until accretion of sediments to create tidal marsh at current sediment and sea level predictions occurs. However, this time period could be considerably shortened if acceptable fill in large quantities becomes available. Higher sea level rise scenarios will

obviously prolong those predictions beyond the current estimate. However, it should be noted that the short-term salt marsh habitat (estimated 30 acres, or twice the current acreage) would be available within the next few years, and is thus not expected to be affected by greater-than-predicted rates of sea level rise particularly over the next several decades while rates are still predicted to be moderate. Immediate restoration of tidal flow, coupled with the predicted moderate rate of sea level rate of sea level rise would give the Site the greatest opportunity to accrete to a level where it can keep pace with accelerating sea level rise in the following decades since established marshes are expected to be able to keep pace with moderate rates of sea-level rise through on-going accretion of sediment and organic matter (Cahoon, 1997). Rates of peat accumulation may be increased by higher availability of carbon dioxide (Cherry et al., 2009).

Cullinan Ranch Restoration Project is located in the midst of a large San Pablo diked baylands complex. The diking efforts, prior to 1900 and again in the 1940's, resulted in extensive subsidence from oxidation of peat sediments, compaction, and sediment starvation. In the case of Cullinan Ranch, the Site has subsided up to 6 feet below marsh plain elevation. Given the central location of Site amidst other similarly subsided sites, it is beyond the scope of this project to provide tidal marsh habitat across the entire project area that would benefit wildlife with the predicted and varied sea level rise scenarios.

The Refuge is currently undergoing a separate Comprehensive Conservation Planning effort and is seeking other land acquisitions and projects that are well suited topographically to provide habitat in consideration of changes in sea level.

1-E. Response to Comment 5: Fill sources: Impacts, benefits, mitigation potential, and contaminants
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 1; Chapter 3 number 25.

A vital concern during the planning of this project over the past 16 years has been to assess impacts to air quality, road conditions and surrounding environments (loss of soil/habitat in other areas) that would occur if fill materials were trucked or brought in by barge to the project site. Since Cullinan Ranch Restoration Project is such a large project, it was determined that the ability to design a project that would fully develop the entire 1,525 acres to meet marsh plain would be infeasible.

Truck traffic was evaluated for different haulage scenarios to accommodate varying levels of fill brought to the site. Constructing a 10:1 slope levee the entire length of the southern boundary of Cullinan Ranch along Highway 37 would require approximately 58,500 truck trips (Chuck Morton, Caltrans, personal communication). This would require trucks to deliver dirt to the site twenty-four hours per day for a period of two years. In most cases the impacts to traffic flows on the already constricted Highway 37 and actual damage to the road surface made this level of imported fill infeasible.

The preferred alternative for this project dictates the use of onsite material as much as possible to construct the buttress levee and create pickleweed marsh along the area of the north levee and adjacent to Guadalcanal Village. Once certain components of the project are constructed to protect the highway, provide safe access to the public, and create the desired topography in the form of channels within the site, the Refuge will attempt to continue bringing in suitable, clean dredge spoils and other clean soils as they become available to build up the interior of the project until the site is breached. Materials will be brought in to the project site by barge when possible to alleviate pressure on the highway. Thirty acres of SMHM habitat is proposed in the first few months of restoration, described more fully in the response to Baye Comment 2. Once we have established a minimum of 30 acres of habitat at tidal elevation, plans to breach would be implemented.

Pond 1 source materials are comparable to those found in Sonoma Creek and the strip marsh to the south or what would be found in the surrounding areas. Pond 1 materials will be used primarily to fill the toe ditch that runs parallel to the Pond 1 levee inside Cullinan Ranch Restoration Project.

1-F. Response to Comment 6: Ditch Block Function in a Pre-Vegetated Subtidal Basin.
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

Ditch blocks were added into the design in the event they would be needed and are not integral to the design of the project.

1-G. Response to Comment 7: Pre-flooding Component of Project Design. (This question references the fate of vegetation on site.)
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 7.

Pre-flooding is designed to be a shallow flooding of the site to slowly move terrestrial wildlife out of the project area during a period of time when flooding already occurs and terrestrial wildlife would be at the lowest numbers. Additional flooding to cover the site will be minimal. This will decrease the terrestrial wildlife exodus to the highway. No effort will be made to remove vegetation from the site.

1-H. Response to Comment 8: Names and Locations of Marshes.
Concur-Figure Changed

See Errata Chapter 2 number 3.

1-I. Response to Comment 9: NEPA vs. CEQA Impact Analysis Consistency
Comment acknowledged with additional clarification

No clarifications in the Errata were added.

The combined Draft EIS/EIR document conforms to the standards of the practice for California.

Comment Letter 2. Barbara Salzman, Marin Audubon Society, Conservation Committee

2-A. Response to Comment 1: Project Design
Comment acknowledged with additional clarification

For clarifications related to this comment, see Table ES-2 BIO-3, BIO-10 and BIO-20; Errata Chapter 2, number 2.

The purpose behind pre-flooding the Site with shallow water prior to breaching is to allow terrestrial wildlife to slowly move out of area (rather than force wildlife onto Highway 37 if the site were breached in the dry). This step is designed to reduce hazards to both wildlife and humans on Highway 37. The shallow flooding across the entire wetland plain is not intended to assist with breach action.

2-B. Response to Comment 2: Transition Zones
Comment acknowledged with additional clarification

For changed text related to this comment, see Table ES-1; Table ES-2 BIO-3, BIO-10, and BIO-20; Errata Chapter 2 numbers 1, 2, 4, 6, 9, 10, and 11; Chapter 3 numbers 8, 11, 17, 25, and 32

See response to P. Baye, Comments 1 and 2.

2-C. Response to Comment 3: Levee Height
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 5; Chapter 3 numbers 2 and 6.

A 9 foot (NGVD 1929) elevation for the buttress levee will protect Highway 37. This levee height was requested by Caltrans engineers to insure that the buttress levee provides an equal level of protection as compared to other portions of Highway 37 (personal communication, Joe Peterson, Caltrans).

2-D. Response to Comment 4: Public Access Impacts
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

The National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) -- … constitutes an "organic act" for the National Wildlife Refuge System. It was amended by Public Law 105-57, "The National Wildlife Refuge System Improvement Act of 1997." Public Law 105-57, approved October 9, 1997…gives guidance to the Secretary of the Interior for the overall management of the Refuge System. The Act's main components include: a strong and singular wildlife conservation mission for the Refuge System; a requirement that the Secretary of the Interior maintain the biological integrity, diversity and environmental health of the Refuge System; a new process for determining compatible uses of Refuges; a recognition that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, when determined to be compatible, are legitimate and appropriate public uses of the Refuge System; that these compatible wildlife-dependent recreational uses are the priority general public uses of the Refuge System; and a requirement for preparing comprehensive conservation plans. As such, the proposed public access components in the project fulfill the requirements of this Act. All public access on the Refuge is regulated by a law enforcement coordination program that operates between the CDFG and the San Francisco Bay National Wildlife Refuge Complex Law Enforcement staff.

The levee, on which the boardwalk would be constructed, is owned by the CDFG and is already open to the public as is the adjacent parking lot. Dogs are currently permitted but must be kept on leash. The boardwalk would be placed within 100 yards of the parking lot and will cover an area of 300 to 500 square feet. This area represents a very small portion of the entire project site, which encompasses an area of approximately 65 million square feet.

The boardwalk would provide access that meets American Disabilities Act standards so that physically challenged and the disabled public would have safe access to the water's edge for the purposes of wildlife observation, photography and fishing. The current levee road does not provide safe access to persons in wheelchairs. Due to the size of the boardwalk and its proximity to the parking lot and Highway 37, the boardwalk would not further impact clapper rail or other sensitive species that would use the marsh.

In the project description, a kayak portage is included as part of the public access. First, a clarification is needed. The "portage" site will would allow kayak access into the project; it would not be a portage in the true sense of the word. The kayak access is a permitted requirement of the NSRP under their Bay Conservation and Development Commission (BCDC) permit. It was first required to be placed into Pond 1 at the parking lot, but due to the shallow depth of water in Pond 1, CDFG and USFWS agreed to place the kayak access on the Cullinan Ranch Restoration Project side of the levee. Bay Conservation and Development Commission concurred. The kayak access and the channel leading to it are designed to be deep and to remain open. However, should the site silt in, the USFWS would not dredge this area. If this kayak access site silts in, a new site elsewhere on the Refuge would be found and the access moved. Kayakers would likely travel into the channels and sloughs beyond the restoration site. There is currently only one other site where kayak access is available in the North Bay and that is at Hudeman Slough north of

Skaggs Island. Other boat access sites such as Brinkman's Marina on the Napa River are not suitable kayak access points due to open waters and boat traffic in those areas.

The USFWS does not have jurisdiction to preclude boating on navigable waters of the State of California.

2-E. Response to Comment 5: Habitat Impacts
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 numbers 1 and 9.

The project site currently has no deep water habitat for diving ducks. The project will incorporate deep water habitat that connects to Dutchman Slough into its design in order to provide materials for buttress levee construction and to prevent fish entrapment. Deep water diving duck habitat is expected to persist for decades if not indefinitely on the project. The overall project site in 50 to 60 years should provide a mosaic of tidal marsh, sloughs and deep water pools connected by deep channels. Diving duck populations will be monitored with other bird use of the area.

Comment Letter 3. Maureen Gaffney, Bay Trail Planner, San Francisco Bay Trail

3-A. Response to Comment 1: Public Access within the Proposed Project Area
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 5.

Public access easements that currently exist on the Site are those held by the California State Lands Commission and include small access roadways and the north levee. Restoring the Site to full tidal flows and the action of opening Cullinan Ranch Restoration Project to public access via kayaking and boating will not nullify those easements as stated in the comment, but indeed will expand them to include the entire 1,525 acre site for as long as the site remains open water. In addition, the Cullinan Ranch Restoration Project will provide a small amount of land based public access in the form of kayak access, additional parking, boardwalk and levee, as well as safe entry and exit to and from these amenities. When both water and land based access are combined, the entire 1,525 acres of the site, as well as the adjoining slough system of the NSRP will be accessible by foot, kayak and/or boating.

While open water will persist for some time, allowing public access to the entire site, eventual establishment of marsh habitat will provide habitat for endangered species. Once endangered species are established on the site, access across Cullinan Ranch Restoration Project will be limited to upland areas, including levees and boardwalks, and to open sloughs. A portion of the area within the Cullinan Ranch Restoration Project is expected to remain accessible by shallow draft boats even after it has reached the desired restoration goal of a mosaic of tidal marsh, channels, sloughs and deep pools in fifty to

sixty years. The USFWS does not have jurisdiction to preclude boating on navigable waters of the State of California.

The USFWS supports the San Francisco Bay Trail and recognizes that the San Francisco Bay Trail is interested in placing a trail along the three mile length of Highway 37 adjacent to the project. It is understood that the Bay Trail is interested in the ability to link the Site with other sections of the Bay Trail on Highway 37. However, unlike other sections of Highway 37, most of the highway along the Site is restricted to a single lane of traffic each way with a concrete barrier separating the oncoming traffic lanes from each other. Vehicular rate of speed varies from 45 to 65 mph with peak monthly vehicle counts of 32,000 cars per day (personal communication, Chuck Morton, Caltrans 2004). If for any reason, a vehicle has to veer to avoid impact or something on the road the only place for the vehicle to travel is into the Site. Wildlife mortalities on Highway 37 were recorded for a period of one year from 1999 through 2000 (Winton and Takekawa 2001). Within the single year, a total of 291 animals and several reptiles were observed dead on the pavement or immediately adjacent to the highway shoulder (Winton and Takekawa 2001).

It is well beyond the scope of this restoration project to place a trail along Highway 37 along this stretch of road due to public safety issues. All work currently planned is within the Caltrans right-of-way. The Refuge would strongly encourage the SF Bay Trail organization to work with us in finding a more suitable location for a trail.

The Refuge is currently undergoing its Comprehensive Conservation Planning process. While there are currently few opportunities for public access onto the Refuge, other areas are being strongly considered where safe access can be provided. These areas will soon be transferred to the Refuge and have multiple opportunities for new public access or existing access enhancements. These new sites include Guadalcanal Village, Skaggs Island, Sonoma Baylands and Sears Point.

Refer to P. Baye, Comment 1, and paragraph 1 regarding other levee considerations along Highway 37 (wildlife and habitat, armoring). Other levee alignments that would have been more amenable to establishing a trail along Highway 37 were infeasible for other reasons including the amount of wetland that would be filled, the amount of fill needed, and the truck or barge (transportation) trips that would be needed to deliver the fill.

Armoring Highway 37 with riprap will not change the current configuration of the highway shoulder itself (See Page 47, Figure 2.6 for cross-section of riprap design). There will be no additional material to provide a surface for any type of travel. Along the portion of the highway where riprap will be used, the riprap is not intended to prevent flooding of Highway 37 but to prevent erosion of the highway from waters within the project. The portion of the highway that is below MHHW is the eastern portion, where a levee approximately 0.7 miles long will be constructed to protect the highway from project induced flooding.

The project will provide a critically needed and safe access point for the public along Highway 37. We believe the ability to provide safe access is vital. This project does not preclude the future placement of a trail alignment along the southern boundary of the Site. Future projects on the Refuge will consider the Bay Trail in all planning efforts.

Comment Letter 4. San Francisco Bay Conservation and Development Commission

4-A. Response to Comment 1: Identify and Quantify Area and Activities Within the Commission's Jurisdiction and Identify BMPs to Protect Natural Resources.
Concur-Text Changed

For changed text related to this comment, see Errata Chapter 2 numbers 9, 10, and 11; Chapter 3 numbers 5, 32, and 33.

The *outboard marsh along the* north levee bordering the Site along the Dutchman and South Sloughs, *Pond 1 and its dividing levee with Cullinan Ranch, and a strip of land along Highway 37*~~*as well as the levee between Guadalcanal Village and the Site*~~ are located within the Commission's jurisdiction. Emissions of PM 10 were identified as a less than significant impact with the implementation of mitigation in the Draft EIS/EIR. Mitigation measures are shown on pages 162-163 and excerpted below. These include the following measures.

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

- Replant vegetation in disturbed areas as quickly as possible.

The following Optional Control Measures may be implemented during construction activities to further reduce emissions of PM10 pollutants.

- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the Site.
- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.
- Limit the area subject to excavation, grading, and other construction activity at any one time.

In addition, the Refuge will develop a Storm Water Pollution Prevention Plan (SWPPP) in cooperation with the San Francisco Regional Water Quality Control Board, the construction management contractor, and the selected contractor. The SWPPP will include BMP's applicable to the selected method of construction. The USFWS and their selected construction manager, Ducks Unlimited, have chosen not specify construction methods *a priori*; rather will leave these to the discretion of the contractor to minimize costs. Briefly, Best Management Practices will be implemented and may include but are not limited to a designated nightly staging area, confined refueling area, and the placement of drip cloths under equipment, among other appropriate mitigation measures. The Cullinan Ranch Restoration Project is a self-contained site and storm water discharges to receiving waters would only occur after the site is breached, at which time, all slope stabilization and re-vegetation measures will be in place, with the possible exception of the levee lowering. Levee lowering would be done such that all material removed would be brought to the interior slope and all perimeter vegetation would be left intact and undisturbed. The lowered levees would be left with a slight cross slope such that any precipitation would flow into the site.

4-B. Response to Comment 2: Wildlife Refuge Priority Use Area: Design and evaluation of the project should include analysis of anticipated habitat type, potential fill activities, flood management measures, mosquito abatement measures, non-native species control measures, diversity of public access and recreational activities and water quality protection.
Concur-Text Changed

For changed text related to this comment, see Table ES-1; Table ES-2 BIO-3, BIO-14, BIO-20, BIO-31, LU-1, LU-5, and LU-8; Errata Chapter 2 numbers 1, 2, 4, 5, 6, 9, 10, and 11; Chapter 3 numbers 2, 11, 15, 21, 22, 23, and 25.

Anticipated Habitat Type: The anticipated immediate habitat type (5 to 10 years post-construction) that will result from the Cullinan Ranch Restoration Project will be that of a minimum 30 acres of tidal marsh habitat adjacent to Guadalcanal Village (see

Baye, Response to Comment 2) with additional non-contiguous tidal marsh habitat of approximately 40 acres along Dutchman slough where levee lowering activities will occur. This acreage will be adjacent to intertidal mudflats and open water that will persist for a period of 10 to 50 years into the future as sediments are naturally deposited into the site, channels form and marsh plain is reached. During this time period, intertidal mudflats will slowly replace open water (subtidal) areas. Some areas that are more deeply excavated for channels and deep pools are intended to be self sustaining by the daily tidal prism and remain open. If these channel or pools sediment in, no dredging will be conducted. Anticipated wildlife use within the first 10 years would include salt marsh harvest mouse, clapper rail, black rail, and other tidal marsh dependent species. Deep water areas will accommodate diving and some puddle ducks as well as various fish species. Areas between the tidal marsh zone and deeper water will accommodate shore and water birds during low tide events.

Potential Fill Activities: Clean sediments from onsite dredge activities as well as clean soils from other offsite construction activities will be actively sought as fill for the Cullinan Ranch Restoration Project to produce a minimum of 30 acres of tidal marsh habitat when flooded as described above and in Baye response to Comment 2. Material from channel dredging within Pond 1 will be used to fill the borrow ditch in Cullinan Ranch adjacent to the Pond 1 levee. The fill will also be used to flatten the levee side slope. This material will be in place prior to breaching the unit.

Flood Management Measures: A buttress levee, 0.7 mile in length, will be constructed adjacent to Highway 37 to protect the highway from project induced flooding. This levee will meet Caltrans standards. The Pond 1 levee will be raised to protect it from overtopping.

Mosquito Abatement Measures: All vegetated habitat will be designed to be within the range of MHHW to MHW so that tides will inundate those sites during high tide events and the water will drain completely when tides move out. The rest of the site will likely remain deep water for decades. As tidal marsh develops, channels will form which will provide adequate drainage to prevent stagnant pools of water from forming thereby, reducing mosquito production and preventing fish entrapment. The Refuge has worked with Solano Mosquito Abatement District to design this project to minimize mosquito habitat and will continue to do so.

Measures to Control Non-Native Species: Non-native plant species will be dealt with through the USFWS Integrated Pest Management program using native plant restoration and active control (mechanical and chemical) as described in Baye response to Comment 3. The Refuge already has a proactive invasive weed eradication program that is currently targeting *Lepidium latifolium* and non-native *Spartina* species.

Opportunities for a Diversity of Public Access and Recreational Activities: Public Access – see Barbara Salzman, Marin Audubon Society, response to Comment 4, Public Access Impacts and Maureen Gaffney, SF Bay Trail, Response to Comment 1: Public Access within the Proposed Project Area.

Water Quality Protection: See E: Response to Comment 5 below.

4-C. Response to Comment 3: Public Access
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 5.

Please see Peter Baye, Ph D, response to Comment 1, Naked Riprap and Erosive Effects of Winds; Barbara Salzman, Marin Audubon Society, response to Comment 4, Public Access Impacts; and Maureen Gaffney, SF Bay Trail, Response to Comment 1: Public Access within the Proposed Project Area.

The Refuge is currently developing a Comprehensive Conservation Plan which will guide the management of the entire Refuge, including Cullinan Ranch. While there are currently few opportunities for public access onto the Refuge, or along the Highway 37 corridor, other areas are being strongly considered in the Comprehensive Conservation Plan where safe access can be provided. These new sites include Guadalcanal Village, Skaggs Island, Sonoma Baylands and Sears Point. These areas will soon be transferred to the Refuge, and will provide multiple opportunities for new public access or existing access enhancements.

The USFWS recognizes that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, when determined to be compatible, are legitimate and appropriate public uses of the Refuge System. These compatible wildlife-dependent recreational uses are the priority general public uses of the Refuge System; and a requirement for preparing comprehensive conservation plans. The public access and uses outlined for the Cullinan Ranch Restoration Project have undergone and comply with the appropriate use and compatibility determination process for the draft Comprehensive Conservation Plan that is currently being developed.

The USFWS appreciates the offer for design review and we look forward to working with you during the permit process.

4-D. Response to Comment 4: Public Views: The project should have beneficial impact on views.
Concur-Text Changed

For changed text related to this comment, see Errata Chapter 3 number 24.

The project will create views consistent with views of the surrounding area including open water, mudflats and tidal marshlands. Views will approximate the current views of the site (Appendix 2), with the exception that there will be more open water with some intertidal habitat throughout most of the project site for the next several decades. The

Salt Marsh Harvest Mouse habitat at the east end of the project site will be at marsh plain elevation prior to breaching.

4-E. Response to Comment 5: Water Quality
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 numbers 2, 9, 10, and 11; Errata Chapter 3 numbers 5 and 19.

Prior to breaching at the project, water will be impounded into the site through the water control structures placed within the Pond 1 levee. This water will be on the site long enough to displace terrestrial wildlife prior to full breach and opening the site to tidal flows. As such, there is the concern that water could become anaerobic. To prevent a potential release of larger volumes of anaerobic waters entering the sloughs during breaching, breaches will occur at rising tides allowing water to enter the Site for several hours prior to the reversal of tidal flows. The entry of slough waters into the Site will allow mixing and dilution of the anaerobic waters to occur before the water moves back out into the slough.

4-F. Response to Comment 6: Sea Level Rise and Safety of Fills
Concur-Text Changed

For changed text related to this comment, see Errata Chapter 3 numbers 2, 3, 6, 7, and 8.

Please see Peter Baye, PhD., Response to Comment 4, Sea Level Rise; and Barbara Salzman, Marin Audubon Society, Response to Comment 3, Levee Height.

The Site is ideally suited for restoration to salt marsh. Previous attempts to develop the area into a housing community and marina would have resulted in the placement of structures on fill without adequate protection from flooding or sea level rise, a practice that would directly conflict with the policies in BCDC's San Francisco Bay Plan, the federally-approved management plan for the San Francisco Bay. Preservation as a natural area and restoration of tidal salt marsh would allow the area to accrete sediments over time and will minimize the impact of sea level rise, while greatly reducing associated potential adverse effects to structures by minimizing development and infrastructure in the area.

The public access features that would be constructed as part of this project will be placed at or above current flood control elevations, as they will be located along Pond 1 levee, with the addition of access lanes along Highway 37.

4-G. Response to Comment 7: Analysis of Impact of Multiple Sea Level Rise Scenarios on project
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 3 numbers 2 and 6.

The Highway 37 embankment ranges in elevation from 4 to 11 feet (NGVD 1929) along Cullinan Ranch (Draft EIS/EIR p 45). The average existing elevation within the project is -2.0 feet NGVD; elevations range from 3-8 feet below sea level). We were not able to obtain data on vertical land motion in the project area.

4-H. Response to Comment 8: Current Rates of Sedimentation
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 3 numbers 3 and 7.

California Department of Fish and Game's Pond 3 was recently restored to tidal action as part of the NSRP and would be the nearest source of sedimentation data. However, sedimentation rate data (from sedimentation plates) have not yet been analyzed (personal communication, Karen Taylor, CDFG Biologist). Once available, the Pond 3 sedimentation data would provide a reasonable estimate of sedimentation rates for the Cullinan Ranch Project Site. In addition, the USGS is currently conducting a bathymetry study in the region, but they are not expected to have data until mid 2009. United States Geological Survey compared bathymetry data collected in winter 2005 to data collected by Towill in 2001 using a different sampling technique. Assuming that the data are comparable, approximately 1.9 feet of sediment accreted on average over the entire pond between the two survey periods (Takekawa, 2006).

4-I. Response to Comment 9: Estimated Rate of Sea Level Rise
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 3 numbers 2, 3, 6, and 7.

Since accurate sedimentation rates and vertical land motion rates are unknown for the Site, we cannot assess the estimated rate of relative sea level rise for the project area. Moffatt & Nichol utilized 2.0 mm/year sea level rise in hydrologic modeling and analysis, in accordance with 2001 Intergovernmental Panel on Climate Change predictions. A Calfed Independent Science Board indicates most models use 5-14 mm/year or 50-140 cm/century. Please see also the response to Peter Baye, PhD, Comment 4: Sea Level Rise.

4-J. Response to Comment 10: Hydraulic Changes Resulting in Changes in Tidal Heights, Ponding Duration, Drainage, Erosion, or Sedimentation
Comment acknowledged with additional clarification

For clarifications related to this comment, see Table ES-2 HYD-1, HYD-2, HYD-3, and HYD-4; Errata Chapter 2 numbers 1, 9, 11, and 12; Errata Chapter 3 numbers 1, 3, 4, 5, and 8.

Initial modeling results from Moffatt and Nichol indicated that breaches along the Cullinan Ranch Restoration Project portion of the South and Dutchman Slough levee could result deepening of Dutchman slough and in scouring of Pritchett Marsh to the southeast of Guadalcanal Village at the mouth of Dutchman Slough. The modeling results indicate that if opposing Pond 3 levee breaches are completed at the same time, this will draw Napa River flow through Pond 3 and increase the capacity and flow in South Slough, which was historically the primary slough in the area. This would ameliorate the potential for scour at the mouth of Dutchman Slough, particularly at Pritchett Marsh.

4-K. Response to Comment 11: Levee Heights and Rates of Sea Level Rise.
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 2 number 5; Errata Chapter 3 numbers 2 and 6.

The levee along Dutchman Slough will be breached as part of this project, as will the southern levee along Pond 3. The Pond 1 levee will be raised to a minimum elevation of 8 feet NGVD 1929. The 0.7 mile long buttress levee along Highway 37 would be raised to an elevation of 9 feet (NGVD 1929). The armored section of Highway 37 meets or exceeds 8 feet (NGVD 1929) in elevation. These levee heights are equal or greater than those on surrounding properties.

Comment Letter 5. United States Environmental Protection Agency

5-A. Response to Comment 1: Contaminated Sediments
Concur-Text Changed

For changed text related to this comment, see Chapter 3 numbers 19 and 20.

Contamination from historic land uses including several metals and pesticides above pollutant criteria levels were found at two sites on Cullinan Ranch. Criteria used to evaluate contaminant levels and their significance can be found in the report completed by Tetra Tech EM, Inc. (Draft EIS/EIR Appendix D). Subsequent soil excavation and disposal efforts were taken by GeoEngineers to remediate the contaminated soils described in the Tetra Tech 2003 report (Appendix 3).

Zinc concentrations that exceeded San Francisco Bay Ambient Sediment Concentrations and Effect Range - Median (ER-M) levels were identified and bounded to be within the roof drip-line of the Pole Barn on Cullinan Ranch. On July 19, 2006 and again on September 9, 2006, GeoEngineers directed the removal and disposal of a total of 50.69 tons of zinc-contaminated soil from the site. Excavated soils were disposed at Keller Canyon Landfill in Pittsburg, California. The results of confirmatory soil sampling indicate that the impacted site soils have been removed and no zinc contamination remains.

Nickel, DDT's and chlordane levels detected in the Farmyard area were also delineated and remediated on August 6, 2008. Again, two clean up efforts were directed by GeoEngineers, resulting in the removal and disposal of more than 34.86 tons of contaminated soils. The soils were disposed at Keller Canyon Landfill in Pittsburg, California. The results of confirmatory soil sampling indicate that the soils contaminated with nickel, DDT's and chlordane have been removed from the site.

No other sites on Cullinan Ranch were identified as having contaminants on them and no further hazardous waste remediation is planned.

5-B. Response to Comment 2: Sediment Dynamics
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 3 numbers 3 and 7.

Various reports state that sediments within the San Francisco Bay are limited and there is a potential that the project could impact other restoration projects nearby such as Pond 3 of the NSRP. We are not aware of any good sediment data for the immediate vicinity of the project. The USGS collected bathymetry data at Pond 3 in winter 2005 and compared it to a Towill 2001 survey. Data were collected using different methodologies. Assuming the data sets comparable, Pond 3 accreted an average of 1.9 feet throughout the entire pond (Takekawa et al., 2006). The Napa River is a net exporter of sediment, exporting an intermediate sediment supply relative to other regional tributaries to San Francisco Bay (McKee, 2004). Based on prior restoration experience within Napa-Sonoma Marshes and anecdotal accounts from the NSRP, we believe it is not likely that an increased tidal prism within Site will negatively affect the overall Bay sediment budget. Some sediment within Pond 3 is expected to move with the breaching of the southern Pond 3 levee and project levee. These changes are expected to aid in the development of channels within Pond 3 and should be beneficial to Pond 3 in the long run. Other sediments are expected to be obtained from flows down the Napa River and may affect the amount of sediments that would be deposited in the shipping channel of the Mare Island Strait as well as in the immediate area west of Mare Island.

Sediment and marsh building dynamics are difficult to predict for the project site. Sedimentation data are not yet available for the recently completed NSRP. Data from that project are expected to provide reasonable estimates for sedimentation rates at Cullinan Ranch. Torres and Styles (2007) point out that marsh topography, overland circulation, and their combined effect on transport and accretion are poorly understood even in a local context. They show that marsh topography can influence salt marsh currents spatially and temporally. This is an area in need of more research.

Another important point is that historic marshes were not composed entirely of sediments; rather peat accretion played an important role in marsh building. The initial levee lowering along South and Dutchman Sloughs will provide important endangered species habitat, but will also provide a point from which plants can clonally integrate into

the slightly deeper waters within Cullinan Ranch to begin to build marsh, which in turn will trap more sediments to help build more marsh.

5-C. Response to Comment 3: Adaptive Management
Concur-Text Changed

For changed text related to this comment, see Errata Chapter 2 number 8.

Lessons learned from the Napa Sonoma Marsh Restoration Project (recently completed), and from the restoration of the Napa Plant Site North (a current and separate project) will be incorporated into the development of a mitigation and monitoring plan for the project. The long term monitoring plan will integrate successful techniques from the Napa Sonoma Marsh Restoration Project and from the restoration of the North Unit of the Napa Plant Site Restoration Project.

The project will use the Napa Plant Site Monitoring Plan (Appendix.4) as a basis for its monitoring plan. We expect our project to reach its desired marsh plain elevation within 50 to 60 years. The Napa Plant Site Monitoring Plan will be modified to match the conditions, timeline and needs of the project. Monitoring objectives, timelines, information needs and the processes for evaluation, management and communication of results are not expected to differ substantially from those described in the Napa Plant Site Monitoring Plan.

The plan will be implemented by the Refuge as a component of our normal operations, and will include monitoring protocols, evaluation benchmarks, and alternative trajectories to ensure restoration success. The Refuge and CDFG will coordinate some monitoring efforts and long- term adaptive management strategies to the extent feasible.

5-D. Response to Comment 4: Air Quality
Concur-Text Changed

For changed text related to this comment, see Table ES-2 AQ-3 and AQ-5; Errata Chapter 3 numbers 32 and 33.

Although impacts of the Preferred Restoration alternative on ozone precursors will be less than significant, we will implement the following best management practices. Prior to construction on the project, an inventory of all equipment will be conducted and the suitability of add-on emission controls for each piece of equipment will be identified before ground breaking. The newest, cleanest equipment available meeting the most stringent of applicable or Federal or State Standards will be used to the extent feasible based on equipment availability in accordance with federal regulations. All engines will be maintained and tuned according to manufacturer's specifications to perform at EPA certification levels. Periodic, unscheduled inspections will be conducted to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with the established specifications. Environmental Protection Agency-registered particulate traps and other appropriate controls will be

utilized where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site.

5-E. Response to Comment 5: Source of Offsite Fill Materials
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

The proposed alternative describes use of on-site materials. Riprap used on the site would be imported from local quarries.

We would consider the use of any wetland appropriate soils, which met federal and state regulatory thresholds showing the soils to be clean and contaminant free. Appropriately tested and qualifying dredged materials would be a potential source. A second potential source would be excavated materials from a Refuge site on Sonoma Creek. The Refuge is currently engaged in a separate restoration project to restore historic hydrology to the lower reaches of Sonoma Creek. This project will require the excavation of a relatively large quantity of soil in order to restore historic channels. Since this source is local, and of appropriate type, they would be considered for placement at the Site if the soils met regulatory criteria and transporting them were not restricted by budget.

5-F. Response to Comment 6: Discuss Clean Water Act Jurisdictional Features and Regulatory Process
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

The U.S. Fish and Wildlife Service will consult with the U.S. Army Corps of Engineers to determine Clean Water Act jurisdiction in relation to the dredging/fill of the existing wetlands.

5-G. Response to Comment 7: Information On and Relevance of Napa Sonoma Restoration Project
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

In 1994 CDFG purchased approximately 10,000 acres of former salt ponds. Ducks Unlimited worked with CDFG to restore approximately 5,000 acres into a mosaic of ponds managed for wildlife, shore birds, and waterfowl, seasonal wetlands, and tidal marsh. The managed ponds included the former Cargill salt ponds known as 1, 1A, and 2. Ponds 3, 4, and 5 were restored to tidal salt marsh, totaling 3,500 acres. This work was largely completed in 2006 with the exception of components that were scheduled for completion in conjunction with the restoration of Cullinan Ranch. The remaining work includes improvements to the Pond 1 levee, 3 breaches along the Cullinan Ranch side of

the Pond 3 levee, and public access features including the kayak launch point. These activities are covered under existing permits held by CDFG.

Comment Letter 6. National Oceanic and Atmospheric Administration, National Marine Fisheries Service

6-A. Response to Comment 1: Pre-restoration flooding of the project may have the potential for temporary fish entrainment thereby exposing fish to poor water quality conditions.
Comment acknowledged with additional clarification

For clarifications related to this comment, see Errata Chapter 3 numbers 5, 11, and 18.

Design plans for the Cullinan Ranch Restoration Project include digging of borrow areas. Some of the borrow areas would be largely located within historic slough channels. Other borrow areas would be located at former road beds and other locations that are not necessarily connected to the natural drainage network of historic slough channels. In these cases, borrow areas would be connected to historic channels wherever practicable to improve water quality and decrease the potential for temporary fish entrainment. Pre-restoration flooding is designed to force the movement of terrestrial wildlife from the area slowly to prevent an immediate exodus onto Highway 37 that would create unsafe conditions for wildlife and people. The flood period is not expected to last more than two weeks. Water depths within the Cullinan Ranch Restoration Project will be greater than those in Pond 1 and should be adequate to sustain fish for that period of time with some expected but minimal degradation of water quality. Decomposition rates will be slowed by the lower temperatures present at the time of breaching and the presence of shallow flooding (Mitsch and Gosselink, 1999). If necessary, additional water can be added to the site to freshen water quality. Loss of dissolved oxygen will be minimized since breaching is planned for late fall, when decomposition rates are slower due to lower temperatures (Mitch and Gosselink, 2007; Sanmartí and Menéndez, 2007).

6-B. Response to Comment 2: Inadequate drainage of the Cullinan Ranch project could result in poor water quality conditions.
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

Design plans for the project include digging of borrow areas to generate fill for the buttress levee, SMHM habitat, riprap above MHHW, and filling of existing levee toe ditches. Wherever practicable, these borrow areas would be connected via constructed or historic channels to improve water quality and to ensure sufficient drainage of Cullinan Ranch to assist flow of water from the Site to the Dutchman and South Sloughs. The breaches within the outer levees will be excavated to the lower of the internal channel or slough thalweg. This design will allow adequate water exchange to occur to maintain good water quality within the site. Initially breaches to the adjacent slough system will

result in a muted system and mudflats won't be exposed at low tides. As the system evolves and the site accretes sediments, mudflats will become exposed. At this time some locations within the project will be deeper than the adjacent slough channels and temporary impoundment of water will occur between tides. The length of time that water is impounded within the project site between tides will be minimal, less than 24 hours, with no loss of water quality expected.

6-C. Response to Comment 3: Concerns regarding water quality if an exchange of water occurs between the Cullinan Ranch Restoration Project and Pond 1 via the water control structures.
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

The Site is subsided well below the level of Pond 1. No water exchange is likely to occur between the two units until Cullinan Ranch has reached the desired marsh plain in approximately 50 to 60 years. Water control structures between units will not be left open and will not be part of routine operations.

6-D. Response to Miscellaneous Email regarding fish screens:
Comment acknowledged with additional clarification

There were no changes in the Errata directly related to this comment.

Discussions regarding the use of fish screens on the Pond 1 levee water control structures will be pursued with the National Marine Fisheries Service. Pond 1 levee intake has no screens and is unsuitable for the placement of screens. Fish entrained into Pond 1 would be in better condition if allowed to pass into Cullinan Ranch during pre-breach flooding because water levels in Cullinan Ranch will be deeper than those in Pond 1. Water quality (DO) during the pre-breach flooding is not expected to reach critical levels and fish entrained in Cullinan Ranch during pre-breach flood up will be able to leave Cullinan Ranch once breaching occurs. Full breaching should occur within 1 to 2 weeks of flood-up.

Migration of winter-run Chinook, spring-run Chinook and Central Valley steelhead will occur during the period of time that breaching of Cullinan Ranch is planned. There are no pumps associated with this project and no pumping of water is planned for this project so take of fish will not occur due to pumping. Consultation in the form of a Biological Assessment and Section 7 with NMFS will take place to determine whether or not fish will be impacted by breaching during the migration window.

Comment Letter 7. Caltrans

7-A. Response to Comment 1: Need for Geotechnical Investigation along State Route[1] (SR) 37 and complete design for buttress levee and riprap placement.
Concur-Text Changed

For changed text related to this comment, see Errata Chapter 2 numbers 2, 4, 5, 6, 9, 10, and 11; Chapter 3 number 3.

A literary search for existing geotechnical investigations will be conducted and additional investigations performed as necessary to facilitate the design. A geotechnical investigation is needed for the area along Highway 37.

The buttress levee, riprap armoring, deceleration and acceleration lanes are all located within Caltran's Right-of-Way. As a matter of public safety the design for these components will be closely coordinated with Caltrans. Design details, plans and other technical information will be submitted to Caltrans at appropriate design levels for their review and comment.

7-B. Response to Comment 2: Concerns regarding minimizing impacts to traffic along Highway 37, trucks using the turn-around at Skaggs Island, provision of acceleration distance, coordination of plans for acceleration/deceleration lanes with Caltrans, and checking the turn templates at Skaggs Island Road.
Comment acknowledged with additional clarification

For clarifications related to this comment, see Table ES-2 TR-2 and TR-3; Errata Chapter 2 numbers 4, 5, 10, and 11; Chapter 3 number 25, 26, and 28.

Construction activities and traffic control will be closely coordinated with Caltrans in accordance to the conditions contained in the Right-of-Way Permit. Construction traffic will be specifically staged to minimize adverse effects to Highway 37 in cooperation with Caltrans recommendations.

7-C. Response to Comment 3: Provision of information on freeway drainage to grassy swale, tidal conditions, storage capacity of drainage basin, alternative flood provisions, and compliance with state discharge provisions within the right of way.
Concur-Text Changed

For changed text related to this comment, see Errata Chapter 2 numbers 2, 4, 10, and 11.

Ducks Unlimited will provide additional information to Caltrans about drainage patterns surrounding the grassy swale and Guadalcanal Village during the permit process.

7-D. Response to Comment 4: Cultural Resource evaluation must be conducted.
Concur-Text Changed

[1] Please note that State Route 37 and Highway 37 are used interchangeably throughout the Draft EIS/EIR. Each term refers to the California highway known as State Route 37.

For changed text related to this comment, see Table ES-2 CR-3 and CR-5; Errata Chapter 3 numbers 34 and 35.

In addition to notifying the USFWS regional archaeologist the Refuge manager will also contact the specified cultural resources individual at Caltrans if archaeological/cultural resources are encountered within the Caltrans right of way.

7-E. Response to Comment 5: Projects within the Caltrans Right of Way require an encroachment permit.
Comment acknowledged

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